

Quadratics

Different Forms

Polynomial $f(x) = ax^2 + bx + c$

Vertex (standard) $f(x) = A(x-H)^2 + K$

factored $f(x) = A(x-R_1)(x-R_2)$

Zeros

Factor it

Quad. Formula

Completing the Σ

Max/min

Polynomial (find zeros)
avg. $\frac{R_1 + R_2}{2}$

vertex (H, K)

Factored (avg. roots, plug in)

vocab

Parabola

vertex

zeros, roots, x-int

increasing/decreasing

max/min
axis of symmetry

(Completing the S_2 .

$$x^2 - 2x - 6 = 0$$

$$x^2 - 2x = 6$$

get constant to other side

$$\frac{1}{2}(-2) = (-1)^2 = 1$$

take $\frac{1}{2}$ the b-term, square it

$$x^2 - 2x + 1 = 6 + 1 \quad \text{add to both sides}$$

$$(x-1)^2 = 7$$

factor lft side ($x + \frac{1}{2}b$ -term)

Solve for x

$$\sqrt{(x-1)^2} = \sqrt{7}$$

$$x-1 = \pm\sqrt{7}$$

$$x = \pm\sqrt{7} + 1$$

Find vertex

$$(x-1)^2 = 7$$

$$(x-1)^2 - 7 = 0$$

$$\text{vertex } (1, -7)$$

Try Complete the sq.

$$\textcircled{1} x^2 - 12x + 5 = 0$$

$$x^2 - 12x = -5$$

$$\frac{1}{2}(-12) = (-6)^2 = 36$$

$$x^2 - 12x + 36 = 31$$

$$(x - 6)^2 = 31$$

$$\textcircled{2} x^2 + 4x - 4 = 0$$

$$x^2 + 4x = 4$$

$$\frac{1}{2}(4) = (2)^2 = 4$$

$$x^2 + 4x + 4 = 8$$

$$(x + 2)^2 = 8$$

$$\textcircled{3} x^2 + 6x + 34 = 0$$

$$x^2 + 6x = -34$$

$$\frac{1}{2}(6) = (3)^2 = 9$$

$$x^2 + 6x + 9 = -25$$

$$(x + 3)^2 = -25$$

$$\frac{2x^2}{2} + \frac{8x}{2} + \frac{3}{2} = 0$$

$$x^2 + 4x + \frac{3}{2} = 0$$

complete S_2 .

$$ax^2 + bx + c = 0$$

$$x^2 + \frac{b}{a}x + \frac{c}{a} = 0$$

⋮

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Other things of note

- max/min

$$H = -\frac{b}{2a} \quad K = f\left(-\frac{b}{2a}\right)$$

(x-coord) (y-coord)

- To find the A-term given a point

$$y = A(x-H)^2 + K$$

plug in pt. for x + y
Solve for A

Sect. 2.1

#1-8, 11, 12, 13-26(3),
27-33(odd), 35-38(2),
39-42(v)

#31

$$f(x) = \frac{-2x^2 + 16x - 31}{-2}$$

$$0 = x^2 - 8x + \frac{31}{2}$$

$$x^2 - 8x = -\frac{31}{2}$$

$$\frac{1}{2}(-8) = (-4)^2 = 16 \rightarrow x^2 - 8x + 16 = \frac{-31}{2} + 16$$

$$\sqrt{(x-4)^2} = \sqrt{\frac{1}{2}}$$

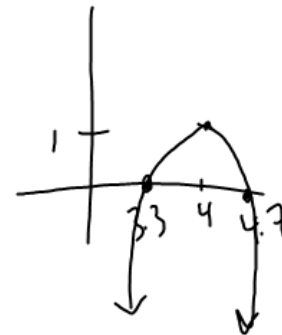
$$x - 4 = \pm \frac{\sqrt{2}}{2}$$

$$x = 4 \pm \frac{\sqrt{2}}{2}$$

$$f(x) = (x-4)^2 - \frac{1}{2}$$

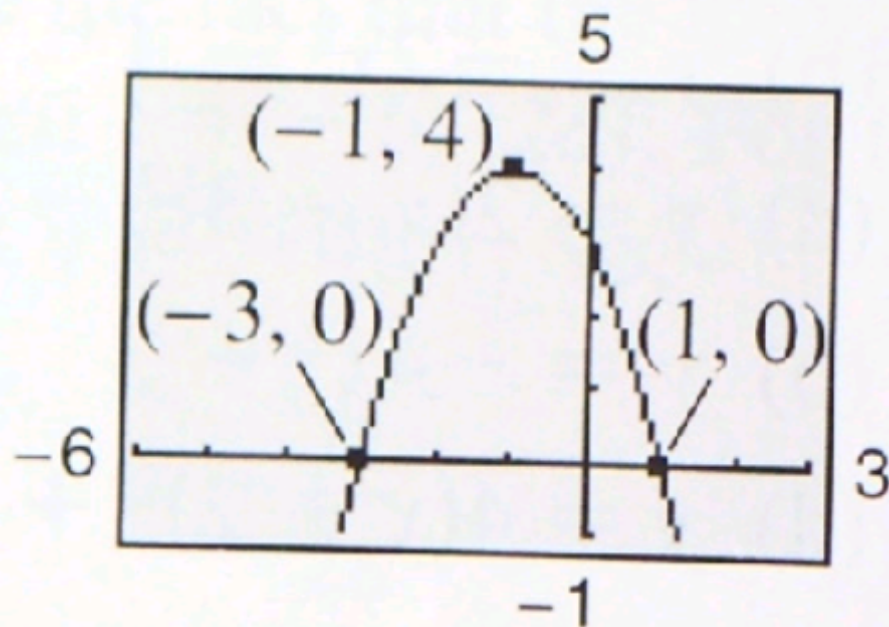
$$f(x) = -2(x-4)^2 + 1$$

vertex (4, 1)





37.



1

Hello Menard

$$f(x) = a(x-h)^2 + k$$

$$f(x) = a(x+1)^2 + 4$$

$$0 = a(1+1)^2 + 4$$

$$0 = 4a + 4$$

$$a = -1$$

$$f(x) = -(x+1)^2 + 4$$

[HW]

• Finish sheet

AND

2.1 # 57-59 (do 2), 61 + 62